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Joseph A. Burton Forum Award Talk: How a Physics Education has Influenced Practice and Graduate Education in Technically-Focused Quantitative Policy Analysis

M. GRANGER MORGAN, Carnegie Mellon University

In a book for the general public published a year before his death, Carl Sagan wrote, “Every time a scientific paper presents a bit of data, it’s accompanied by an error bar—a quiet but instant reminder that no knowledge is complete or perfect.” For those of us educated in experimental natural science such an observation seems so obvious as to hardly need saying. Yet when, after completing a PhD in experimental radio physics, I began to work on problems in environmental and energy risk and policy analysis in the early 1970s, I was amazed to find that the characterization and treatment of uncertainty was almost completely lacking in the analysis of that day. In the first part of this talk, I will briefly summarize how I, and a number of my physics-educated colleagues, have worked to rectify this situation. Doctoral education in the Department of Engineering and Public Policy (EPP) at Carnegie Mellon University has also been shaped by a number of ideas and problem-solving styles that derive from physics. These have been strengthened considerably through integration with a number of ideas from experimental social science – a field that too many in physics ignore or even belittle. In the second part of the talk, I will describe the PhD program in EPP, talk a bit about some of its unique features, and describe a few of the problems we address.